

# One Health Impacts of Agricultural Disasters

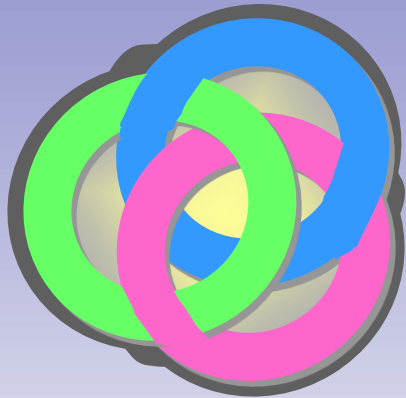
NC One Medicine Symposium, 10 Dec 2014

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*NC State University College of Veterinary Medicine*

# One Health & Ag Disaster Topics



- Agriculture Is Different Now
  - *Differences Drive Risks*
  - *Risks Drive Impacts*
- Types Of Agricultural Disasters
  - *Natural, Accidental, Intentional*
- Types Of One Health Impacts From Agricultural Disasters
  - *Economic Damage*
  - *Food Security/Supply Stability*
  - *Sudden vs Slow Disasters*

# Animal Ag's Role in US Agriculture

2007 Census of Agriculture

United States

## Top 10 Ag Products by Market Value

Item	Farms (Thous)	Sales (\$ Billion)	Rank by Sales
<b>TOTAL U.S. AG SALES</b>	2,205	\$297.2	na
Grains, oilseeds, dry beans/peas	479	\$77.2	1
Cattle & calves	798	\$61.2	2
Poultry & eggs	149	\$37.1	3
Milk & other dairy products from cows	70	\$31.8	4
Fruits, tree nuts, berries	113	\$18.6	5
Hogs & pigs	75	\$18.1	6
Nursery, greenhouse, floriculture, sod	51	\$16.6	7
Vegetables, mellons, potatoes, and sweet potatoes	69	\$14.7	8
Other crops and hay	435	\$10.0	9
Cotton & cottonseed	19	\$4.9	10

[www.agcensus.usda.gov/Publications/2007/Online\\_Highlights/Rankings\\_of\\_Market\\_Value/United\\_States/](http://www.agcensus.usda.gov/Publications/2007/Online_Highlights/Rankings_of_Market_Value/United_States/)

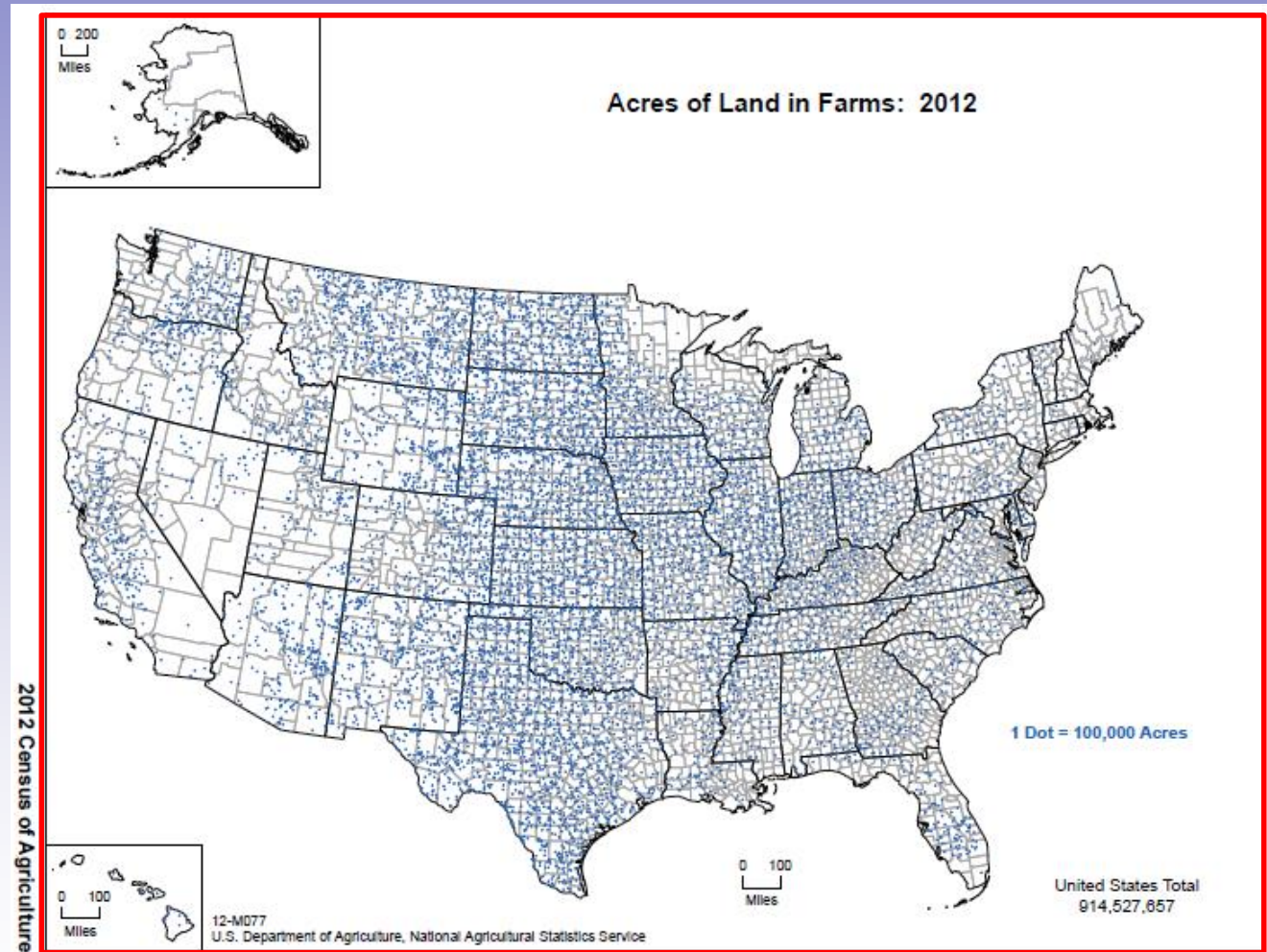


# Where the Farms Are



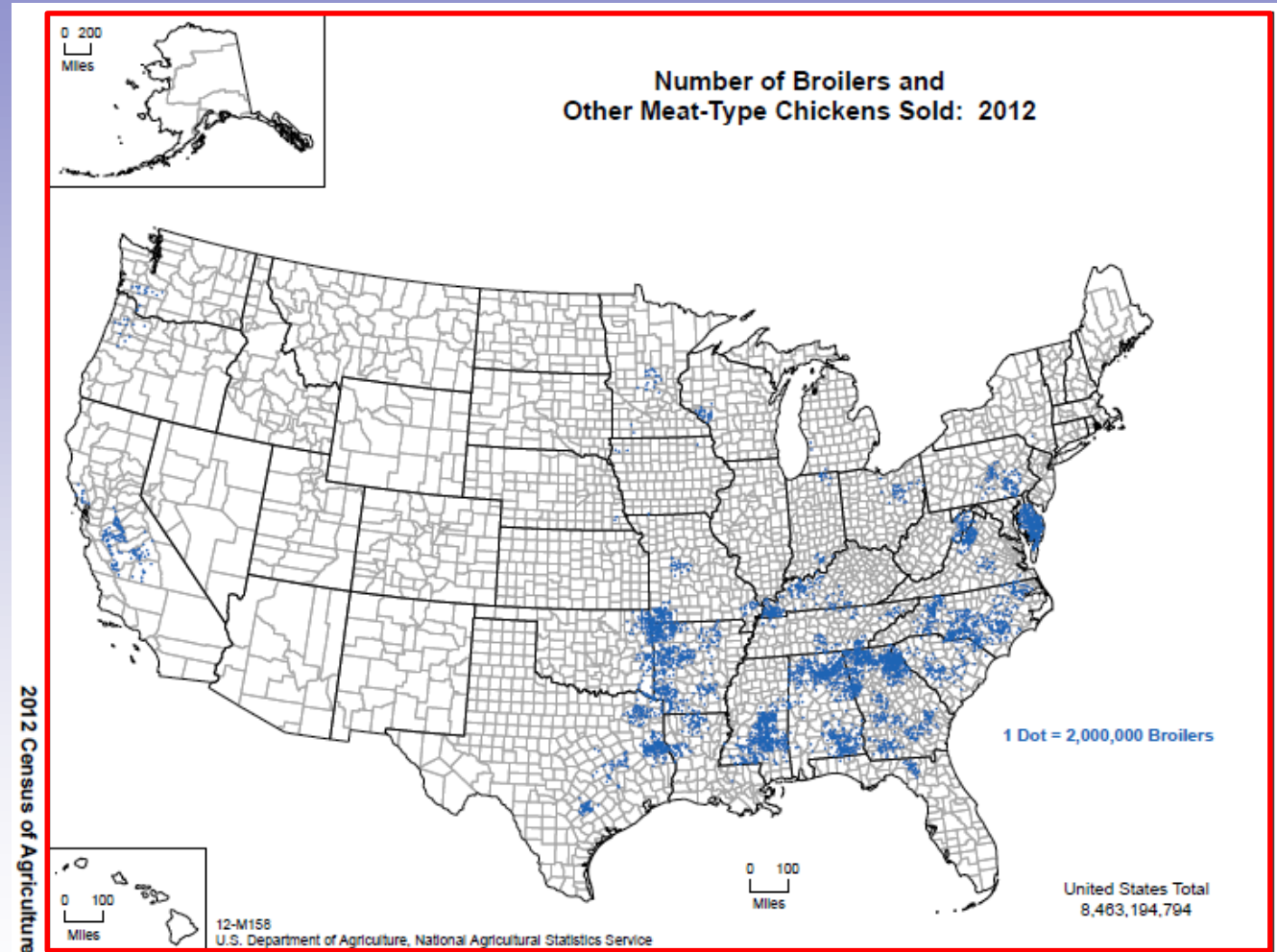
# Where the Farms Are

- Scattered across CONUS, but show concentrations along East, Gulf to Great Lakes, and West Coast



# Where Meat Chickens are Raised

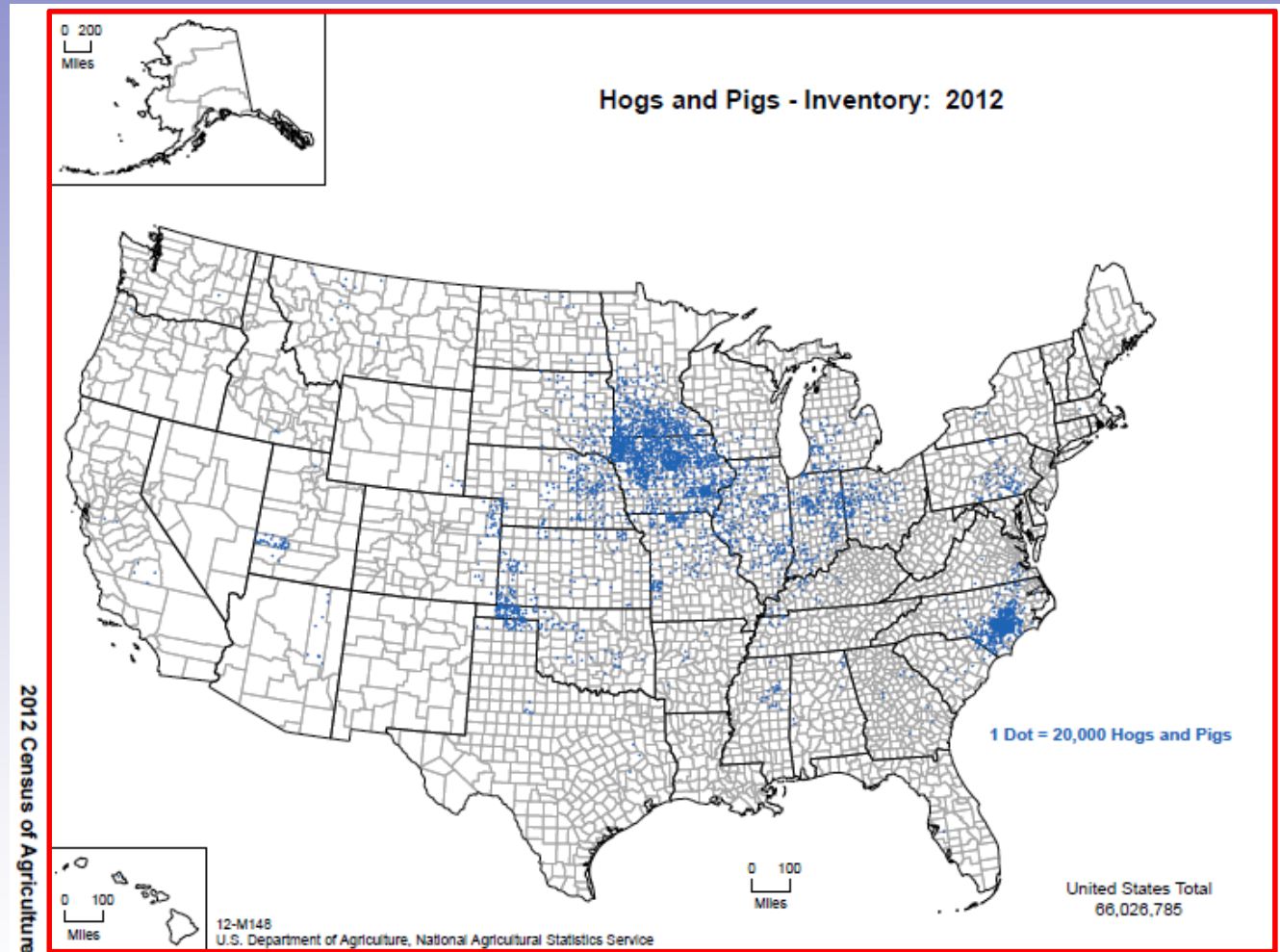
- Regional Production
  - *Mid-Atlantic to Gulf Coast*
- Products and Birds travel throughout region
  - *Transport and energy dependent*



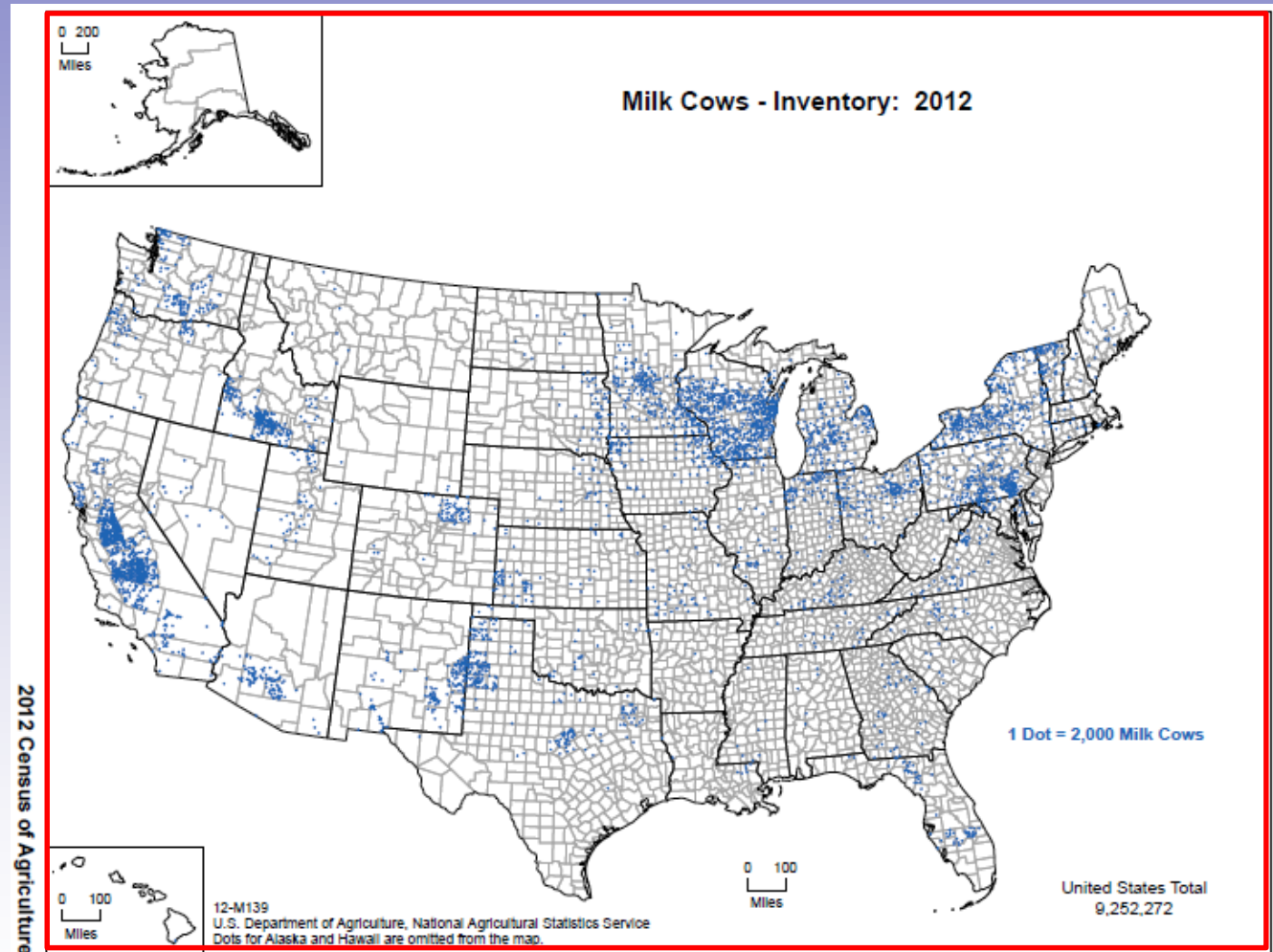


# Where Pigs are Raised

- Three main growth areas; one (MN/IA/IN) is a region
  - *Note- 1/3 of NC pigs finish in other areas*
- Companies work across USA
  - *Transport and energy dependent*



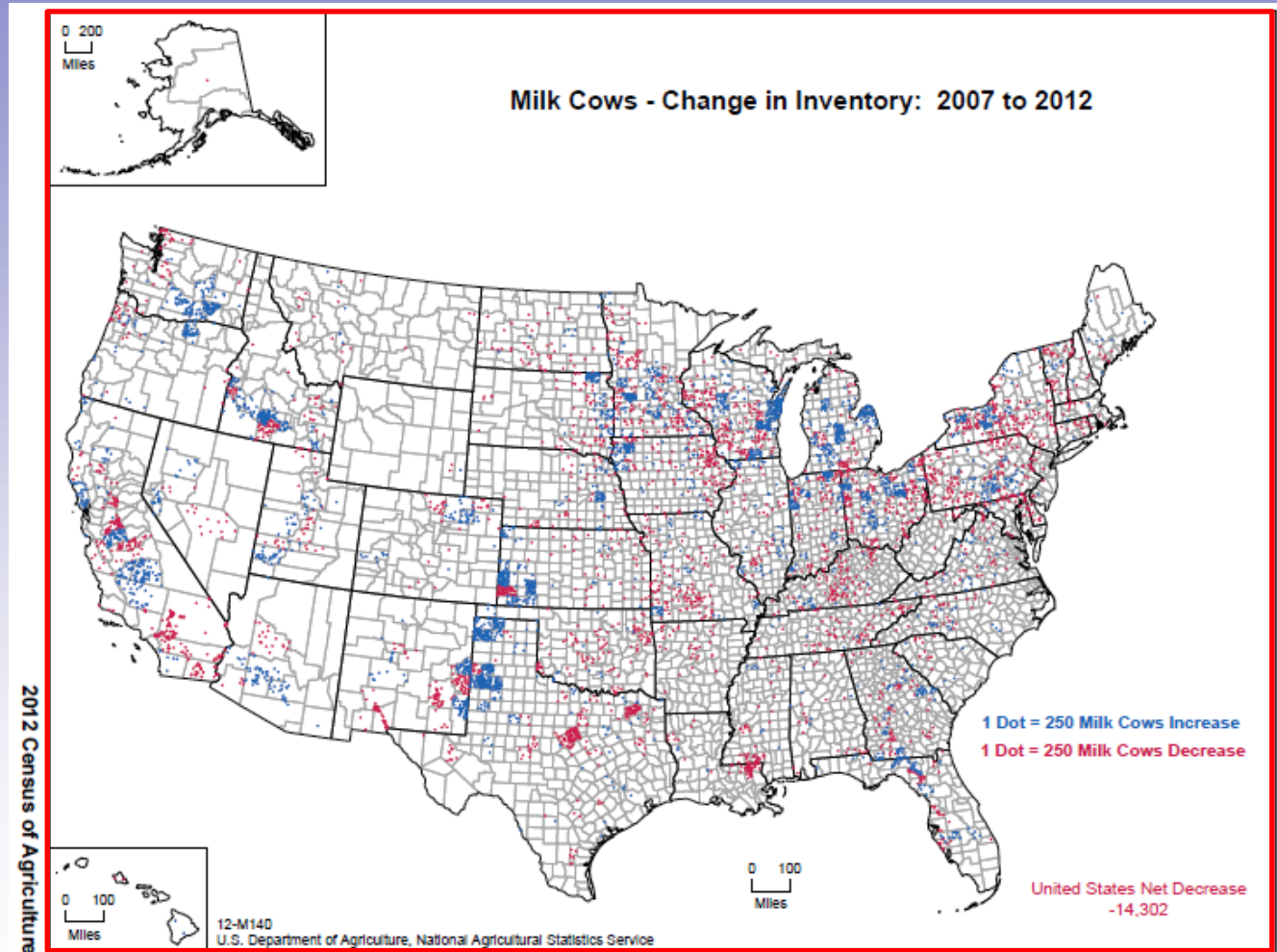
# Where Dairy Cows are raised





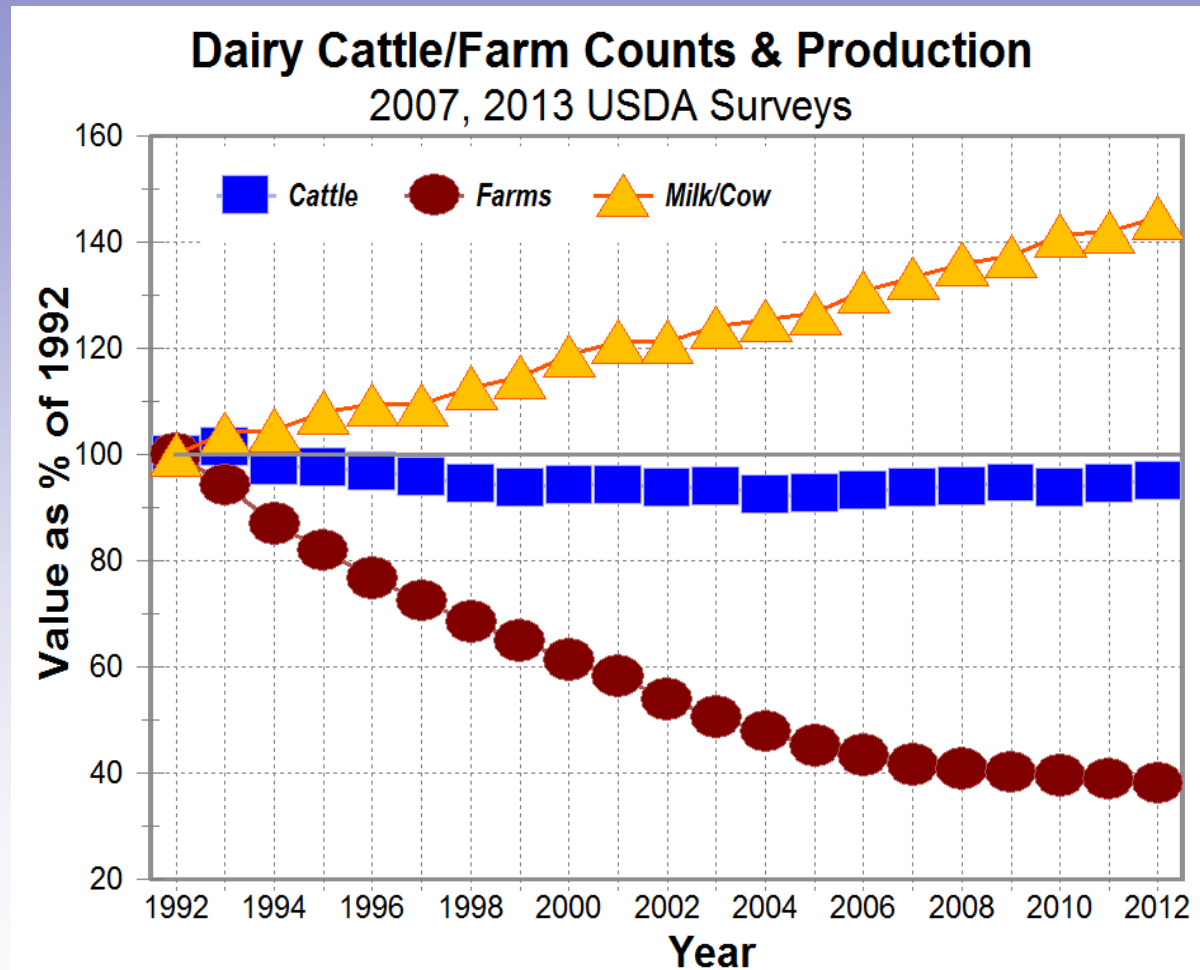
# Where Dairy Cows are, w/ Changes

- Dairy farms decreasing in historic areas of NE and upper midwest
- Gaining in west TX, S ID, and Central CA
  - *Transport and energy dependent*



# Changes over 20 years: Dairy

- Production per cow up over 2% per yr (+45% since 1992)
- Cow numbers ~95% of 1992 counts
- Farm numbers drop by <3%/yr
  - *Leveling off last 6+ yr*
- Total U.S.A. milk prod'n up ~38% vs 1992

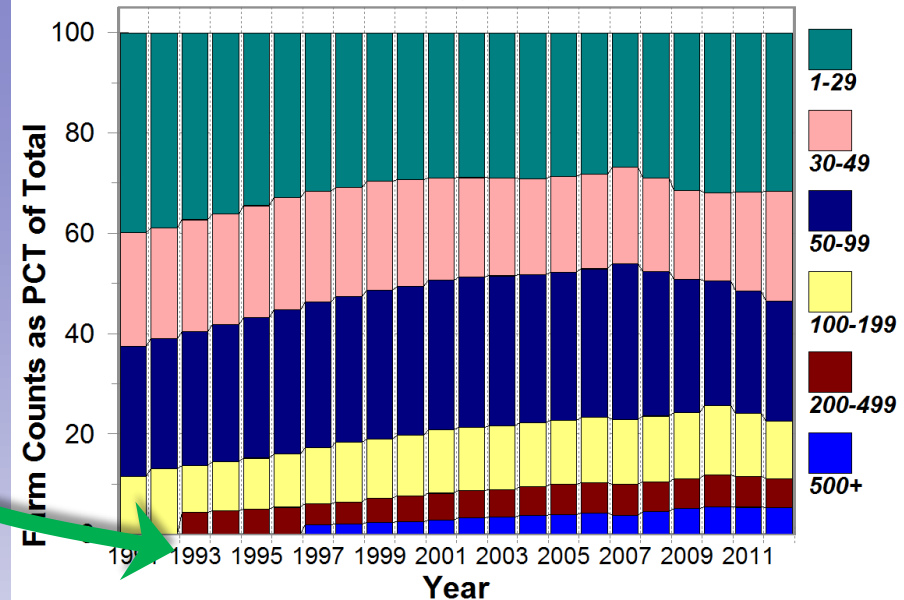


# Fewer, Bigger Farms – Dairy Ex.

- Larger Herds growing in number, but were only ~5% of all herds in 2012
  - *Nearly 80% of farms had less than 100 cows*
- But Big Herds held ~60% of the dairy cows in 2012
  - *Big herds average ~15% more milk per cow, so they produced ~69% of the US' milk in 2012*

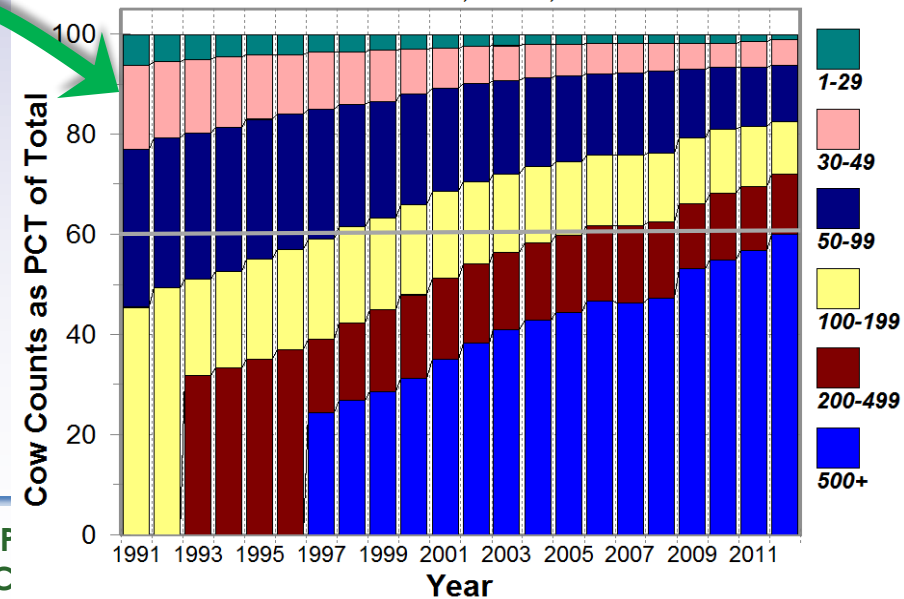
Farm Numbers, by Size Category

USDA. 2007, 2010, 2012



Cow Numbers, by Size Category

USDA 2007, 2010, 2012



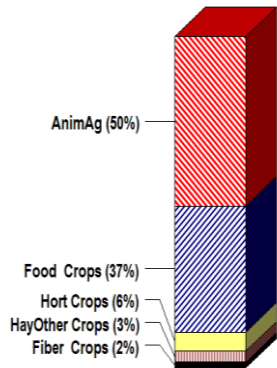
# Ag's Ownership Concentration, One Decade

2001:	3	<u>exporters</u> control	81%	of corn market
2002:	4	<u>meat packers</u> meet	80%	of beef market
2003:	3	<u>processors</u> fulfill	65%	of soy market
2004:	4	<u>pork</u> companies have	62%	of pork market
2005:	8	<u>grocery</u> chains fill	49%	of food sales
2006:	4%	of <u>dairies</u> ship over	50%	of US milk
2007:	2%	of <u>farms</u> comprise	50%	of all ag sales
2008:	6%	of <u>feedlots</u> meet	67%	of beef sales
2009:	2	<u>companies</u> provide	67%	of corn seed
2010:	4	of 7 <u>railroads</u> control	95%	of haulage

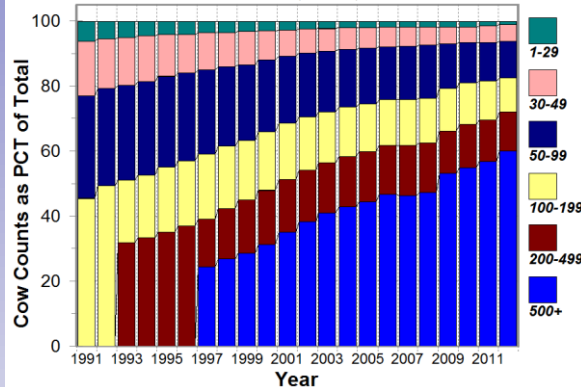


# Summary of Modern Animal Ag

U.S. Ag Sales, Top Ten  
2007 Census of Agriculture

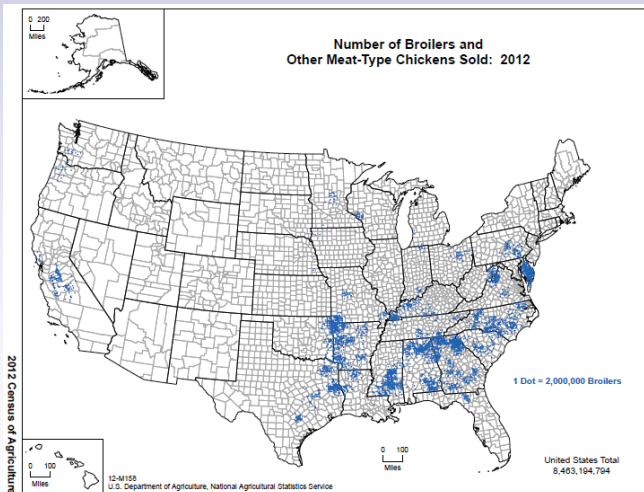


Cow Numbers, by Size Category  
USDA 2007, 2010, 2012



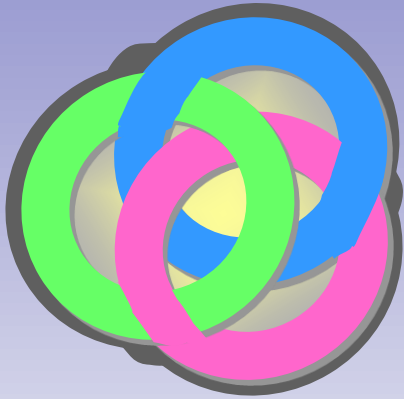
- **IMPORTANCE:** Major part of all ag econ activity
  - **LARGE SCALE:** Fewer farms, but bigger & more dense farms
  - **PRODUCTION CENTERS:** Regionally based
  - **TRANSPORTATION DEPENDENT:** Production, processing, distribution
- These trends will continue

Number of Broilers and  
Other Meat-Type Chickens Sold: 2012





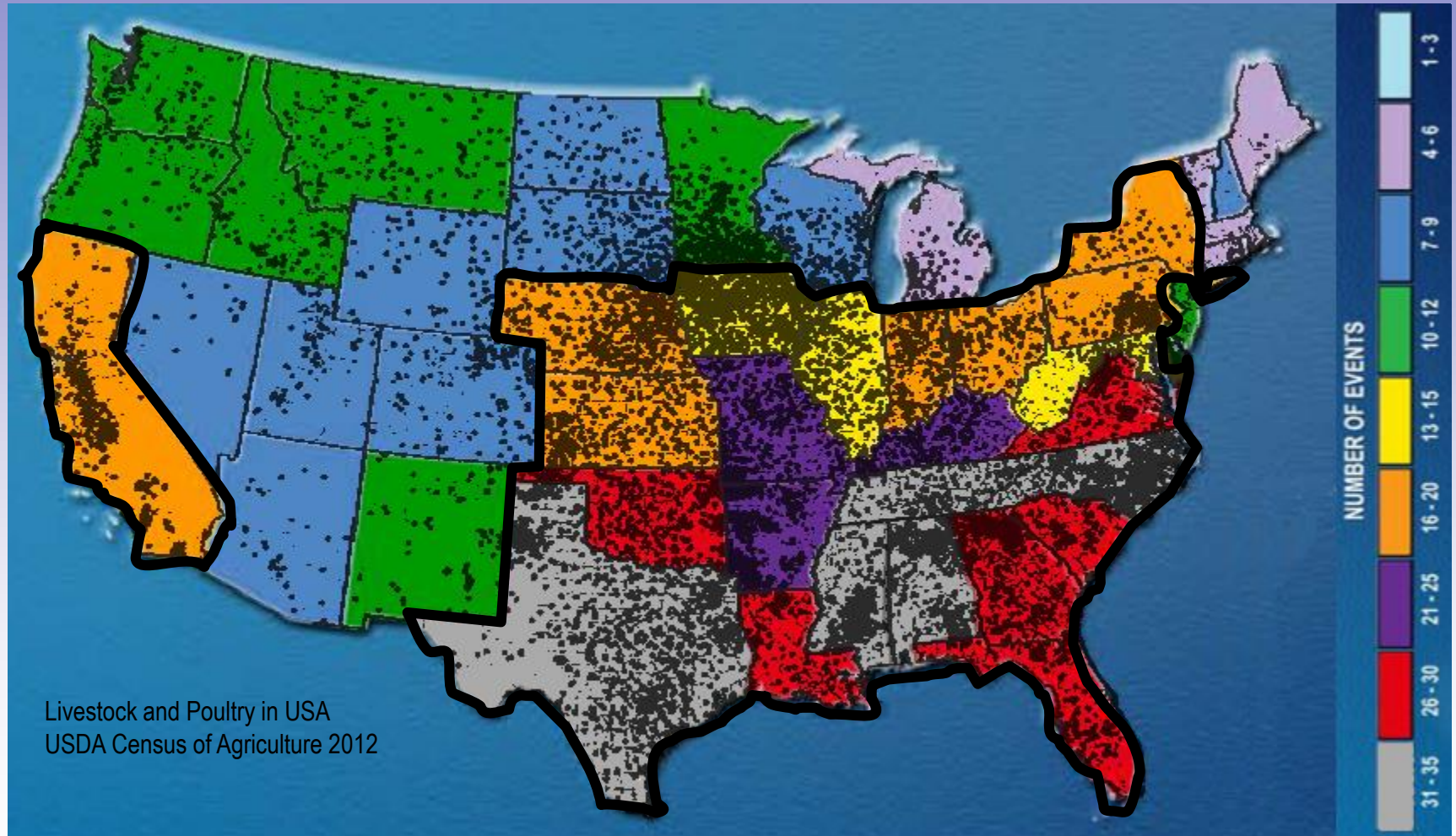
# One Health & Ag Disaster Topics



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- Types Of Agricultural Disasters
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  - *Economic Damage*
  - *Food Security/Safety*
  - *Sudden vs Slow Disasters*

# Natural Disasters:

## Billion Dollar Weather Events 1980 - 2009



Source: NOAA Nat'l Climate Data Center - [www.ncdc.noaa.gov/](http://www.ncdc.noaa.gov/)

Population Health and Pathobiology Department  
NC State University College of Veterinary Medicine

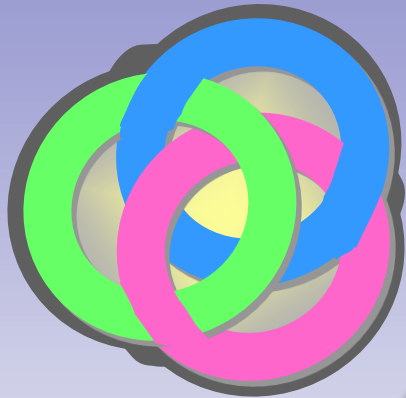


# But not all disasters are 'natural'

- Some are accidental
  - *Chemical Spills or Contaminations*
  - *Power Outages*
  - *Transportation Strikes*
- Some are intentional
  - *Sabotage*
  - *Criminal*
  - *Terrorism*
- Any/All can cause economic, food safety, & food security concern



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# Lessons Learned... Disaster Econs

## UK Foot and Mouth Disease - 2001

- 7 mo's; 70% of all cases in 1<sup>st</sup> 8 wk
- Societal costs ~4.5x the Ag costs
- World was horrified at the destruction and enviro harm
- Blair gov't almost didn't survive election



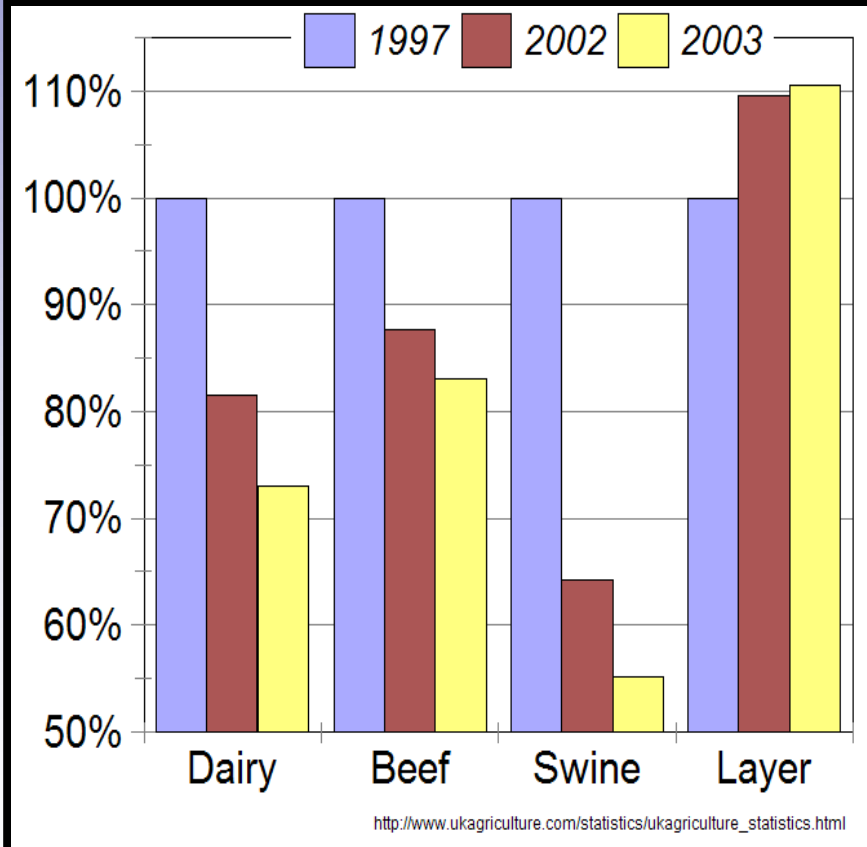


# Lessons Learned... Disaster Econs

## *FMD's Longterm Impact on UK*

- The 2001 FMD outbreak took a toll on UK animal ag
- In six years (97-03) --
  - **BEEF** (↘ 17%),
  - **DAIRY** (↘ 27%),
  - **SWINE** (↘ 45%),
  - **POULTRY** bucked the trend (↗ 11%).

UK Agriculture - % Change in Animal Numbers  
(1997 = 100%)



# Lessons Learned... Disaster Econs

## Taiwan + FMD 3 yrs out (2000-2002)

- Indemnity for Pigs destroyed \$188 M 49.5%
- Fighting Disease (Vacc, disposal, etc.) \$67 M 17.6%
- Loss of Market Value \$125 M 33.0%
- Total Direct Costs \$ 380 M
- Total Indirect Costs (jobs, tourism, etc) \$3,650 M
  - *Taiwan's Societal costs were 9.6x Ag's costs*
  - *Now a net IMPORTER of pork*

***FADs are SOCIETAL disasters striking thru agriculture.  
So, solutions must be societal, not just agricultural.***



# Weather, Farm Economics, and Food Security



# Weather, Farm Economics, and Food Security



## Weather and climate change play a big part in food prices, shortages

**TOKYO** — Once again, world food stocks are looking precarious. Prices are soaring for basic food products and the prospect of hunger, starvation and unrest are rising as well. There are several reasons for this spike in prices, but weather — and climate change — is the most important. According to a United Nations Food and Agriculture Organization report, the FAO price index rose 3.4 percent in January, taking prices to their highest level since tracking began in 1990. Ominously, stocks are low and the trend is expected to continue. There are several factors:

One explanation blames **speculators** who are exploiting rising liquidity to bet on rising commodity prices.

A second cause of the spike is **rising demand**. Populations increase and even those that are leveling off are shifting demand, which requires more grain for production.

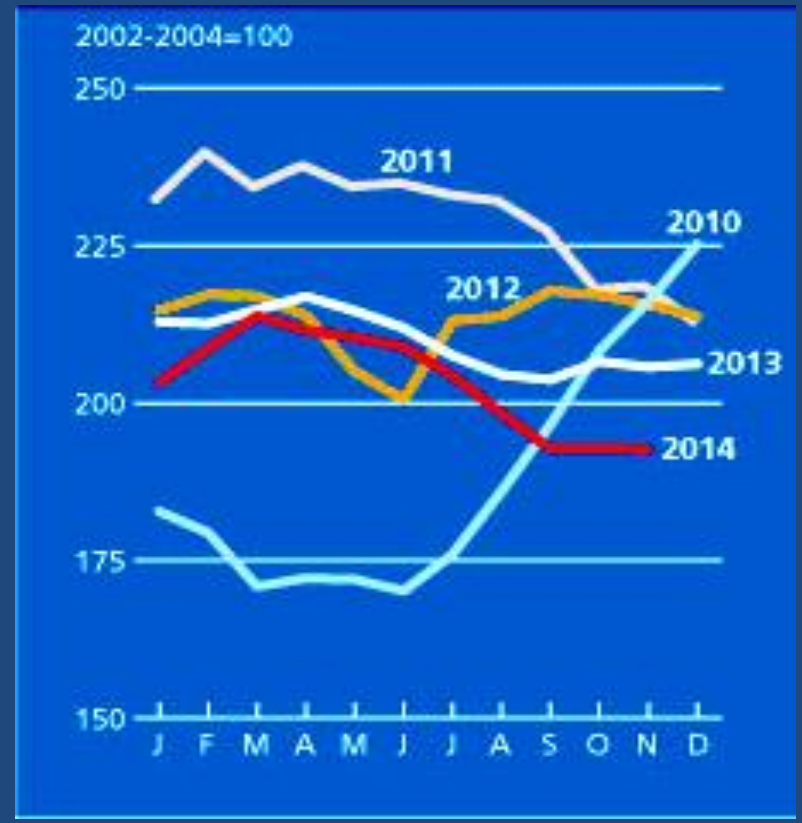
Another factor is the growing popularity of **biofuels**, which adds to the demand for — and prices of — some agricultural products.

### **The most important cause is weather and climate.**

Heavy rain in Australia have decimated that country's wheat harvest, pushing prices of that staple higher. Droughts and fires in Russia and Ukraine did similar damage to those countries' wheat harvests. Equally severe weather took chunks out of harvests in Canada, Brazil and Argentina. Recently, the FAO warned that China faces similar conditions with its agricultural regions set to experience the worst drought in more than half a century. The prospect of domestic shortages means that a government will turn to international markets to make up the shortfall.

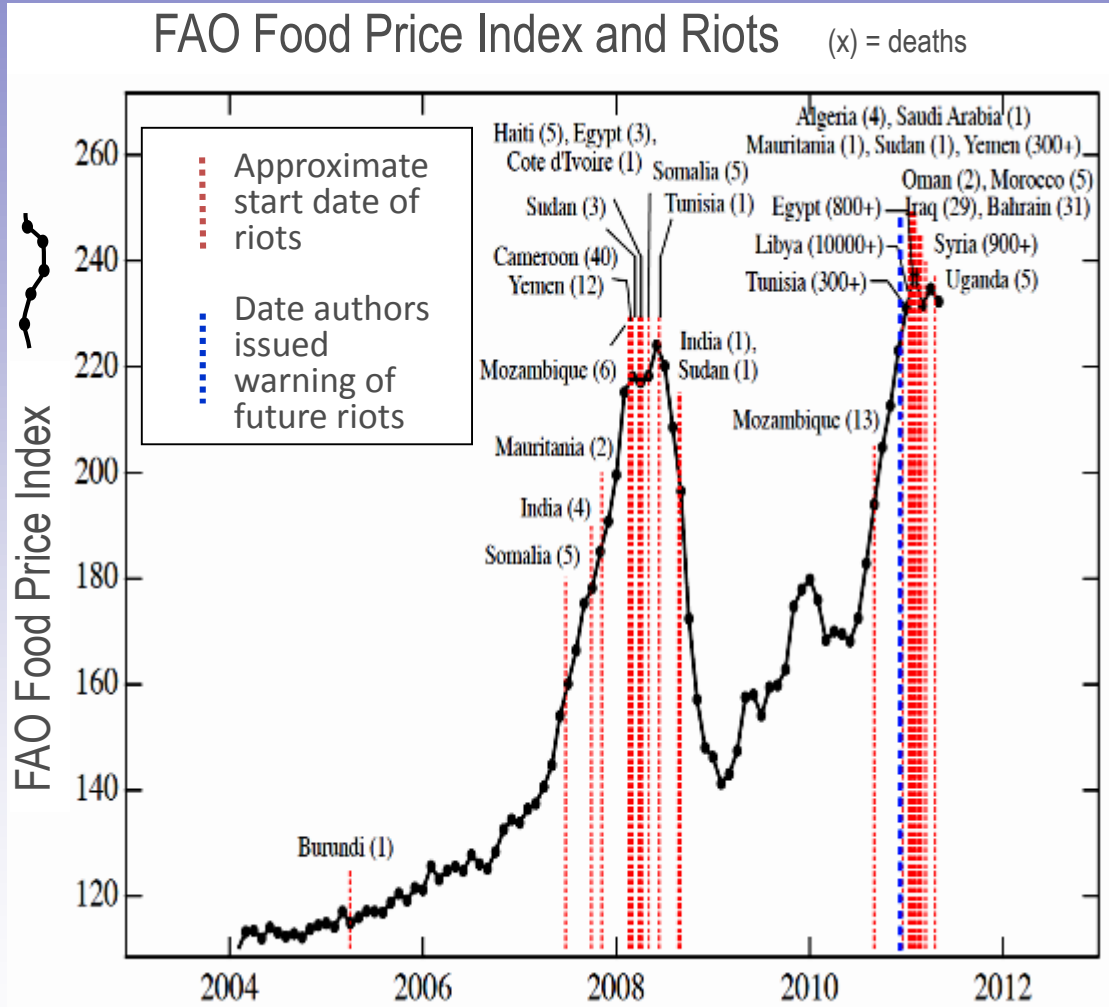
Rising food prices were responsible for riots in more than 30 countries in 2008. The recent unrest in Tunisia and Egypt has roots in food shortages, among other factors.

## FAO Food Price Index – 04 Dec 2014 [Avg 2002-2004 = 100]



# Food security and social stability

- Cause? Trigger?  
Symptom?  
– *Not known*
- Of 30 countries w/  
riots, in 2008 – 2011  
– *All but 3 (Burundi,  
Somalia, India) started  
when the FAO Food  
Price Index was >200*
  - This summer the Price  
Index went below 200 for  
first time in 4 years





# Sudden Disasters and Ag Issues: Security/Safety/Recovery

- Disasters can hit rapidly when you are preparing for something else
- The first things needed are:
  - *water*
  - *food*
  - *emergency med supplies*

## Haiti aid begins to arrive in quake zone

Red Cross officials say death toll could hit 50,000



Erika Santelices / AFP - Getty Images

A man searching for relatives covers his nostrils with a piece of tissue because of the stench of the rotting bodies laid down on a makeshift morgue set in an open yard in Port-au-Prince on Thursday.

MSNBC News Service  
15 January 2011

PORT-AU-PRINCE, Haiti - Desperately needed aid from around the world slowly made its way Thursday into Haiti, where supply bottlenecks and a leadership vacuum left rescuers scrambling on their own to save the trapped and injured and get relief supplies into the capital.



Launch

### Earthquake rocks Haiti

The Caribbean island is devastated by a 7.0-magnitude quake and dozens of aftershocks.

### Americas video

MORE VIDEO

#### Dominican President on Haitian tragedy

**NEW** Jan. 14: President of the Dominican Republic Leonel Fernandez tells NBC's Tom Llamas about the "catastrophe" he saw during his visit to neighboring Haiti.



# Sudden Disasters and Ag Issues: Security/Safety/Recovery

- Geographic & Ownership concentration; Dependence on transportation
- There are few suppliers of some critical agricultural components.
  - *Only two U.S. producers of plastic for milk bottles.*
  - *One is in New Orleans, which is to chemical manufacturing what NY is to finance.*
- **The U.S. came perilously close to a major disruption of the \$35 billion dairy industry.**
- Shortages from Katrina/Rita - % of N. Am. Capacity that went down:
  - **62% of Butadiene** - Tires, hoses, fan belts; seals/gaskets; asphalt binder; roofing.
  - **55% of Hi Dens Polyethylene** - Oil, milk, detergent bottles; gasoline tanks; plastic pipe.
  - **55% of Polypropylene** - Syringes, medical fabrics, dairy & other food packaging.
  - **46% of Lo Dens Polyethylene** - Diapers, food shrink film, bread bags.



# Sudden Disasters and Ag Issues: Security/Safety/Recovery

- Geographic & Ownership concentration; Dependence on transportation

- There are some companies

"After Katrina we got a call from a bottled water company ... scrambling to get some HDPE ... to make bottles so he could supply bottled water to FEMA ... We couldn't help him."

Chemical Co. Exec. in Hurricane Zone

- The U.S. was previously close to a major disruption of the \$35 billion dairy industry.

Katrina/Rita - security that

hoses, asphalt

- **Polyethylene** - detergent bottles; gasoline tanks; plastic pipe.
- **55% of Polypropylene** - Syringes, medical fabrics, dairy & other food packaging.
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# Slow Disasters and Ag Issues: Security/Safety/Recovery

Friday 23 September 2011

## The Telegraph

Famine in Africa: inside Dadaab, the world's largest refugee camp



Image 3 of 5

A Somali woman grazes her herd of goats outside the refugee camp at Dadaab, Kenya Photo: Dominic Nahr

By Sally Williams / 9:00AM BST 17 Sep 2011

It was the death of their last cow that did it for Abdi. He told his wife, Sarura, and their four children that they had to leave. In Bakool, Somalia, they packed some clothes and cooking pots and set out for Dadaab, the world's largest refugee camp, on the edge of Kenya, a 200-mile walk to the south-west. It took 28 days; all they had was a handful of rice and some black tea. ...

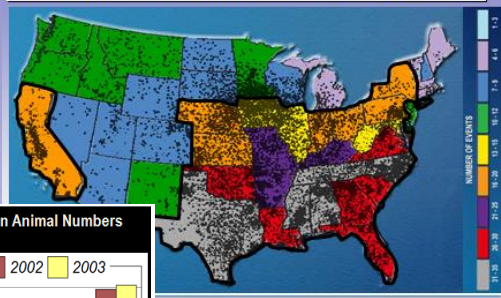
The drought is what is known in the aid world as a 'slow-burning' crisis. Agencies issued warnings last year, but in early July it blew up and shot around the world, stirring everyone into action too late. The March and April rains failed to fall across east Africa this year. ... By early August, the UN Food and Agriculture Organisation said it was the worst drought in 60 years, and the number of people at risk from hunger was 12.4 million.

- Some emergencies only get attention late
  - *Issues go on for years, even if the cameras go elsewhere*
- Understanding roles of animals in society essential for planning and response
  - *Animals give liquidity, labor, fertilizer, fuel, and lastly, food*
  - *Rescuing people w/o their farm animals is not an answer*
- Ag/Envir/DVM/Sociology expertise needed

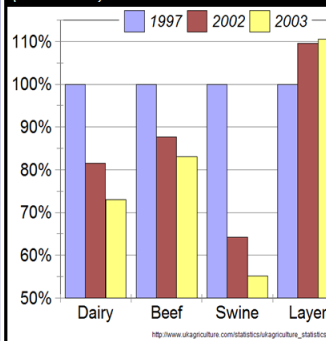


# Summary of One Health Issues and Ag Disasters

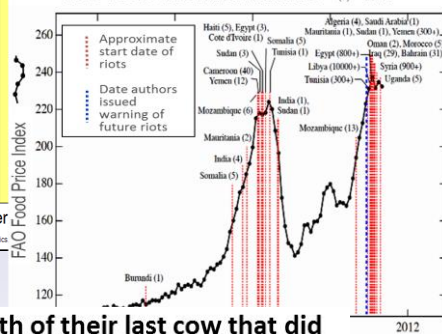
Billion Dollar Weather Events 1980 - 2009



UK Agriculture - % Change in Animal Numbers (1997 = 100%)



FAO Food Price Index and Riots (x) = deaths



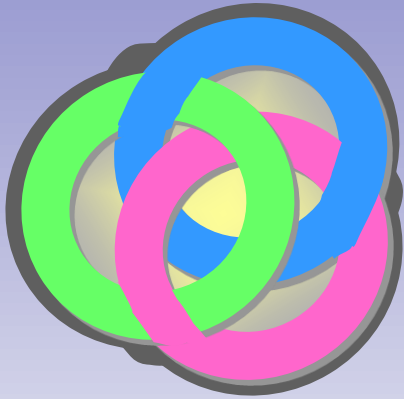
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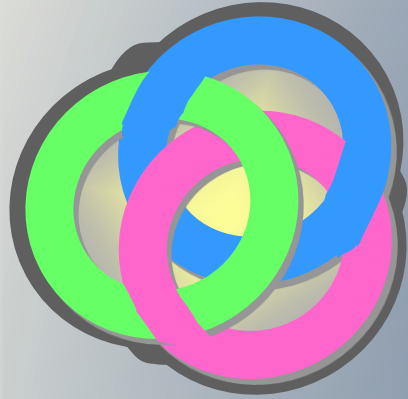
- **TYPES:** Natural, Accidental, Intentional
- **NATURAL:** Majority of US Animal Ag in high weather threat regions
- **ECONOMICS:** Ag disasters have large, far reaching economic impact
- **SOCIAL STABILITY:** Econs & Food Security erode stability
- **RESPONSE:** Ag needs should be primary in response



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